Claims

WHAT IS CLAIMED IS:

1. A method for producing a transgenic Gramineae plant comprising the steps of:

   (a) isolating a zygote from a Gramineae plant to be transformed in a way that said isolated zygote becomes substantially free from its naturally surrounding tissue,

   (b) introducing a DNA composition comprising a genetic component into the genome of said Gramineae plant, wherein said introduction is mediated by Agrobacterium transformation into said isolated zygote;

   (c) regenerating Gramineae plants from said zygotes which have received said genetic component; and

   (d) identifying a fertile, transgenic Gramineae plant whose genome has been altered through the stable introduction of said genetic component.

2. The method of claim 1, wherein the Gramineae plant is selected from the group consisting of wheat, maize and barley.

3. The method of claim 1 or 2, where in the Gramineae plant is a Triticum species.

4. The method of any of claim 1 to 3, wherein the Gramineae plant is regenerated from said isolated zygote by a method comprising co-cultivation of said isolated zygote and/or the zygotic embryo derived therefrom with a feeder system.

5. The method of any of claim 1 to 4, wherein the Gramineae plant is regenerated from said isolated zygote by a method comprising co-cultivation of said isolated zygote and/or the zygotic embryo derived therefrom with a culture of isolated immature pollen or pistils.

6. The method of any of claim 1 to 5, wherein the Gramineae plant is regenerated from said isolated zygote by a method comprising co-cultivation of said isolated zygote and/or the zygotic embryo derived therefrom with

   a) a culture of androgenetically developing barley pollen or
   b) a culture of wheat or barley pistils or
   c) any combination of a) and b).

7. The method of any of claim 1 to 6, wherein the zygotes and the feeder system are physically separated in a way to prevent mixing of the different cell types but to allow exchange of growth factors, proteins, media components, and other low molecular weight compounds.

8. The method of any of claim 1 to 7, wherein co-cultivation of the zygotes and the feeder system are employed already during Agrobacterium co-cultivation in a way

that the co-cultivation culture of the zygotes and Agrobacterium is physically separated from the feeder system in a way to prevent contact of the Agrobacteria with the feeder system but to allow exchange of growth factors, proteins, media components, and other low molecular weight compounds.

9. The method of any of claim 1 to 8, wherein said genetic component is transmitted through a complete sexual cycle of said transgenic Gramineae plant to its progeny, wherein said progeny does not comprise a selectable or screenable marker gene.

10. The method of any of claim 1 to 9, wherein said method does not comprise a step which leads to dedifferentiation of the zygote or the zygote-derived embryo.

11. The method of any of claim 1 to 10, wherein said genetic component comprises a expression cassette comprising a nucleic acid sequence operably linked to a promoter active in said Gramineae plant, wherein expression of said nucleic acid sequence confers a phenotypically distinguishable trait to said Gramineae plant.

12. The method of any of claim 1 to 11, wherein the pH of the medium used during co-cultivation of the isolated zygote with Agrobacterium is kept in a range from about 5.8 to about 6.0.